

V. REMARKS

Claim 30 is rejected under 35 USC 112, first paragraph, for allegedly failing to comply with the written description requirement. The claim is amended to obviate the rejection. Withdrawal of the rejection is respectfully requested.

Claim 42 is rejected under 35 USC 112, first paragraph, for allegedly failing to comply with the written description requirement. The claim is amended to obviate the rejection. Withdrawal of the rejection is respectfully requested.

Claims 29-34 are rejected under 35 USC 103 (a) as being unpatentable over Kemmochi et al. (U.S. Patent Application Publication No. 2003/0012899) in view of Sato et al. (U.S. Patent No. 6,136,092) and Ohama (U.S. Patent Application Publication No. 2002/0192409). The rejection is respectfully traversed.

Kemmochi teaches a doped silica glass crucible for making a silicon ingot. The crucible is adapted for use in formation of a silicon crystal includes a crucible wall having a bottom wall and a side wall. An inner layer is formed on an inner portion of the crucible wall and has distributed therein a crystallization agent containing an element selected from the group consisting of barium, aluminum, titanium and strontium. The crucible is made by forming a bulk grain layer on an interior surface of a rotating crucible mold, generating a high-temperature atmosphere in the crucible cavity and introducing inner grain and crystallization agent into the high-temperature atmosphere, fusing the inner grain to form a doped inner layer. The inner layers of crucibles are adapted to, when heated, crystallize according to any of three operating modes that retain a smooth inner surface and reinforce the structural rigidity of the crucible walls.

Sato discloses a quartz crucible with large diameter for pulling single crystal and a method of producing the quartz crucible. The method of producing the large diameter quartz crucible with an inner diameter of 22 inches or more, being composed of an opaque outer layer having a high bubble content and a transparent inner layer being substantially free of bubble, which crucible is used

for pulling a single crystal, comprising the steps of: feeding first silicon dioxide powder along an inner surface of a rotating mold having a gas permeable wall to form a piled up layer of the first silicon dioxide powder; heating the piled up layer from the inside space of the mold to have the first silicon dioxide powder molten to provide the opaque outer layer as a substrate, while vacuum suction is effected through the wall; generating a high temperature gas atmosphere in an inside space of the substrate during or after the formation of the opaque outer layer; feeding second silicon dioxide powder into the high temperature gas atmosphere to have the second silicon dioxide powder molten at least partly; and directing the second silicon dioxide powder in an at least partly molten form toward an inner surface of the substrate to have the second silicon dioxide powder deposited on the inner surface of the substrate to thereby form the transparent inner layer thereon. The transparent inner layer is of a predetermined thickness and substantially free of bubbles.

Obama reveals a multilayer structured quartz glass crucible and method for producing the same. The multilayer structured quartz glass crucible pulls up a silicon single crystal. Its structure has at least three layers that includes a translucent outer layer made of naturally occurring quartz glass and having a large number of pores, a translucent intermediate layer, made of synthetic quartz glass and having a large number of pores and a transparent inner layer substantially free from pores and made of a synthetic quartz glass. Thermal convection within the silicon melt is suppressed by use of the quartz glass crucible, thereby preventing oscillation on the surface of the silicon melt.

Amended claim 29 recites:

A quartz glass crucible for pulling up a silicon single crystal, said quartz glass crucible having an opaque outer layer formed by melting natural silica powder and a transparent layer structure formed on the inside thereof, characterized in that the transparent layer structure includes a transparent layer made of natural quartz glass with a thickness of 0.4 to 5.0 mm covering the entirety of the inside of the crucible, and a transparent layer made of a synthetic quartz glass having a lower transparent layer portion with a thickness in the range of 0.2 to 1.5 mm and formed on and covering a lower portion of the transparent

layer made of the natural quartz glass of the inside of the crucible in a range from at least 0.15 to 0.55 L, and an upper transparent layer portion with a thickness of 0.2 mm or less and formed on and covering an upper portion of the transparent layer made of the natural quartz glass of the inside of the crucible in a range from 0.6 to 1.0 L in terms of distance L from a center of a bottom of an inner surface of the quartz glass crucible to an upper end face along the inner surface of the crucible.

It is respectfully submitted that none of the applied art, alone or in combination, teaches or suggests the features of claim 29 as amended. Specifically, it is respectfully submitted that the applied art, alone or in combination, fails to teach or suggest a transparent layer made of a synthetic quartz glass having a lower transparent layer portion with a thickness in the range of 0.2 to 1.5 mm and formed on and covering a lower portion of the transparent layer made of the natural quartz glass of the inside of the crucible in a range from at least 0.15 to 0.55 L, and an upper transparent layer portion with a thickness of 0.2 mm or less and formed on and covering an upper portion of the transparent layer made of the natural quartz glass of the inside of the crucible in a range from 0.6 to 1.0 L in terms of distance L from a center of a bottom of an inner surface of the quartz glass crucible to an upper end face along the inner surface of the crucible.

Thus, it is respectfully submitted that one of ordinary skill in the art could not combine the features of the applied art to arrive at the claimed invention because the applied art is devoid of all the features of the claimed invention. As a result, it is respectfully submitted that claim 29 is allowable over the applied art.

Support for the amendments is found throughout the specification and specifically in Table 1 of the specification as well as in Examples 1-5.

Claims 33 and 34 depend from claim 29 and include all of the features of claim 29. Thus, it is respectfully submitted that the dependent claims are allowable at least for the reason claim 29 is allowable as well as for the features they recite.

Claim 31 is canceled and, as a result, the rejection as applied thereto is now moot.

Withdrawal of the rejection is respectfully requested.

It is respectfully submitted that the pending claims are believed to be in condition for allowance over the prior art of record. Therefore, this Amendment is believed to be a complete response to the outstanding Office Action. Further, Applicant asserts that there are also reasons other than those set forth above why the pending claims are patentable. Applicant hereby reserves the right to set forth further arguments and remarks supporting the patentability of their claims, including the separate patentability of the dependent claims not explicitly addressed herein, in future papers.

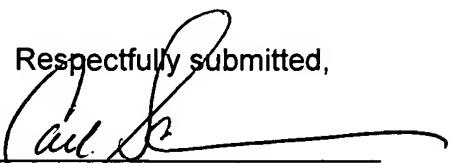
In view of the foregoing, reconsideration of the application and allowance of the pending claims are respectfully requested. Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicant's representative at the telephone number listed below.

Should additional fees be necessary in connection with the filing of this paper or if a Petition for Extension of Time is required for timely acceptance of the same, the Commissioner is hereby authorized to charge Deposit Account No. 18-0013 for any such fees and Applicant(s) hereby petition for such extension of time.

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By:

Respectfully submitted,


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